

STUDIES IN THE EUPATORIEAE (ASTERACEAE). CXIV.

THE GENERA OF BARRO COLORADO ISLAND, PANAMA.

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Sometime ago Dr. Thomas Croat of the Missouri Botanical Garden provided us with a list of species that are commonly called Eupatorium on Barro Colorado Island. The list was provided to allow us to indicate proper disposition of the species. We were asked to state the more obvious key differences between the various genera involved. In response we provide the following key. Mikania and Ageratum are added to make the key to the Eupatorieae of the island more complete. The addition of Ageratum is based on the near certainty of its presence on the island even though there are no collections on record. This little exercise on the genera of Barro Colorado Island is but a first step toward our larger project, the Eupatorieae of Panama.

Eupatorieae

Herbs, vines, shrubs or trees, terrestrial or epiphytic. Leaves opposite, alternate or whorled, simple, rarely compound, usually petiolate. Heads discoid, 1-300 flowered. Phyllaries in 1-8 series, usually separate, commonly imbricated, herbaceous or coriaceous. Receptacle flat, convex, hemispherical or conical; glabrous, hairy or paleous. Flowers perfect and fertile, cells without raphids. Corollas tubular, campanulate, funnelform; rarely irregular, white, blue, pink, red or purple, never yellow. Corolla lobes 5, rarely 4, glabrous, glandular or hairy. Stamens 4-5. Anthers rounded or hastate at base, never tailed; appendage vestigial to elongate, flat often hollow; exothecial cells usually quadrate with thickenings on lateral and transverse walls. Style base with or without node, glabrous to hirsute, immersed in nectary, not elevated. Style branches well developed, sometimes glanduliferous, appendages semicylindrical or terete; papillose or smooth, clavate, truncate or obtuse at apex, stigmatic surface of two distinct lines restricted to lower half of lateral margins, rarely on inner surface and reaching

nearer tip. Achenes prismatic or flattened, 2-10 ribbed, usually 5 or 10; setiferous or glandular; base of achene indistinct or forming a carpopodium; carpopodium if present symmetrical or asymmetrical. Pappus of scales, awns, or setae, coroniform or a few clavate lobes, persistent or deciduous, rarely in more than one series. Pollen spherical, usually ca. 18-20 μ diam., tricolpate, rarely almost smooth, usually short spinose, with rather simple wall structure.

Key to the genera of Eupatorieae of Barro Colorado Island

1. Plants scandent, heads with 4 flowers and 4 principle phyllaries Mikania
1. Plants erect herbs, subshrubs or shrubs, heads with more than 4 flowers or 4 phyllaries 2
 2. Pappus of membranous, flattened, elongate scales or coroniform Ageratum
 2. Pappus setose 3
3. Leaves sessile, subsessile or winged to base Ayapana
3. Leaves definitely petioled, not winged 4
 4. Phyllaries not spreading at maturity, deciduous with age Chromolaena
 4. Phyllaries spreading with age, at least outer phyllaries persistent 5
5. Heads 4-12 flowered, corollas glabrous Critonia
5. Heads 20-80 flowered, corollas usually with glands or hairs 6
 6. Receptacle densely hairy Hebeclinium
 6. Receptacle glabrous 7
7. Outer phyllaries very broad; base of achene slender, very asymmetrical Heterocondylus
7. Outer phyllaries not broader; base of achene short and mostly symmetrical Fleischmannia

Ageratum L. Sp. Pl. 2: 839. 1753.

Annual herbs to perennial subshrubs; few branched. Leaves opposite or alternate, petiolate or sessile, blades elliptic, lanceolate to deltoid or ovate, margins entire to dentate or shallowly lobed. Inflorescence corymbose. Heads small, phyllaries 30-40 imbricated to subimbricated, equal or subequal, in 2-3 series, lanceolate, coriaceous. Receptacle conical, glabrous or paleaceous. Flowers 20-125 per head. Corollas funnelform or tubular, 5 lobed, lobes about as long as wide, papillose, sometimes setiferous on the outer surface, cells of corolla with sinuous walls. Anther collars slender, walls of cells with annulate thickenings. Anther appendage large, longer than wide, composed of rather large cells. Styler base without enlarged node, glabrous. Styler appendage linear, usually strongly and densely papillose. Achenes 4-5 ribbed, usually glabrous. Carpopodium distinct, large, usually asymmetrical. Pappus when present coroniform or of 5-6 free, membranous, flattened scales.

Ageratum conyzoides L. Sp. Pl. 2: 839. 1753.

Ayapana Spach, Hist. Veg. Phan. 10: 290. 1841.

Erect herbaceous plants with mostly opposite leaves, leaves sessile or winged to base, lamina narrowly ovate to elliptical. Inflorescence laxly paniculate-corymbose. Involucre of 15-35 lanceolate subimbricate phyllaries; in 2-3 series; receptacle convex, glabrous; flowers 5-40 per head; corollas tubular or funnel-shaped, glabrous internally, with glands externally on the lobes, cells of corolla narrow with rather sinuous walls; anther collar usually rather slender with elongate transversely annulate cells, exothecial cells rather quadrate, appendage usually long triangular; styler node distinctly enlarged and glabrous, styler appendages with prominent elongate projecting cells; achenes prismatic, 5-costate, with a few to many setae mostly along the costae. Carpopodia very distinct, enlarged with constriction above, cells very thick-walled, lowest row of cells very enlarged and other cell rows much smaller; pappus setae long but reduced to short scales in one species, scabrous, apical cells acute.

Ayapana elata (Steetz) R.M.King & H.Robinson, comb. nov. Eupatorium elatum Steetz in Seem. Bot. Voy. Herald 148. 1854. Costa Rica, Panama.

Chromolaena A.P.Decandolle, Prodr. 5: 133. 1836.

Sparingly to densely branched herbs or shrubs; leaves opposite, triangular to elliptical, margins subentire to highly lobed. Inflorescence laxly to densely corymbose; heads 10-40 flowered; involucre of 18-45, ovate to lanceolate densely imbricate very unequal phyllaries in 4-6 series, phyllaries all deciduous at maturity; receptacle flat to convex, glabrous, pales sometimes present. Corolla tubular with scarcely constricted base; outer surface smooth with tips of lobes usually capped with a group of thick walled often prominently projecting cells, outer surface with few to many short stalked glands and often with rather stiff hairs, without stomates; inner surface of lobes usually papillose with a dense layer of projecting cells, cells inside of corolla tube narrow with sinuous walls with upper ends sometimes projecting. Anther collar composed of numerous quadrate cells below, elongate cells above, usually with prominent ornate banding on walls, bands transverse in elongate cells and oblique or vertical in many of the short cells; exothecial cells mostly about as long as wide; anther appendage large, entire or toothed at the apex; pollen spherical, tricolpate, spinose, modified "type II" present in many species. Style without basal node; surface cells of stylar appendage smooth to long projecting. Achene prismatic, 5 or rarely 3 costate, bearing setae mostly on costae, sometimes with glands; carpopodium short cylindrical or narrowed below, cells small often wider than high with usually thickened walls; embryo usually borne high in the achene on a distinct highly vascularized stalk, lower end of embryo projecting below point of insertion of stalk and partially sclerotized, basal vasculature of achene united to well above level of carpopodium; pappus of ca. 40 slender, scabrous, persistent setae, usually pointed apical cells.

Chromolaena odorata (L.) R.M.King & H.Robinson, *Phytologia* 20: 204. 1970.

Critonia P.Browne. Civ. Nat. Hist. Jam. 490. 1756.

Coarse herbs to small trees or woody vines, sparingly branched. Leaves opposite, distinctly petioled, petioles sometimes winged, blades elliptical to broadly ovate (bases hastate in two species), without capitate glands, with distinct lactifers internally beside the veins or in the centers of the areoles. Inflorescence paniculate, branches opposite usually spreading at 90 degree angles. Heads usually sessile or short pedicellate in clusters of 3-12. Involucre

of ca. 20-25 imbricate, stramineous, usually glabrous, 2-3 striate phyllaries in 4-6 series; inner series elliptical to narrowly oblong, very easily deciduous, outer series very short orbicular, persistent. Receptacles plain to slightly convex, glabrous or with a few hairs. Flowers 4-12 per head; corollas tubular below and sometimes slightly spreading above, glabrous; lobes 5, usually longer than wide with smooth elongate cells, cell walls usually slightly sinuous; anther filament short, inserted above lower third of corolla; corollas slender usually with distinct quadrate cells below, walls inornate or with slight but distinct annular thickenings; anther appendages large usually longer than wide. Style base without enlarged node, glabrous; appendage filiform to spatulate, smooth to slightly mamillate. Achenes prismatic with 5 often very prominent ribs, ribs and surfaces sparsely to densely setose. Carpopodium a narrow rim or short cylindrical, cells small, quadrate to rounded with walls of confluent thickenings. Pappus of 30-35 scabrous, coarse, persistent setae with crowded bases, tips slightly enlarged and more closely serrulate, apical cells usually acute.

Critonia billbergiana (Beurl.) R.M.King & H.Robinson, Phytologia 22: 48. 1971.

Fleischmannia Schultz-Bip., Flora 33: 417. 1850.

Sparingly branched herbs; leaves opposite, rarely subopposite or alternate, elliptical to rhomboidal usually with cuneate short petiolate base, upper margin serrate or crenulate, in one species leaves dissected into long narrow segments. Inflorescence laxly branching; heads 30-50 flowered; involucre of ca. 30 narrow, usually acute, subimbricate, mostly subequal phyllaries in 2-3 series; receptacle glabrous or with minute scattered hairs. Corolla tubular with only slightly narrowed base; outer surface of lobes usually with short hairs, with glands in some mexican and central american species, surface papillose with projecting cell ends especially along margins of lobes; cells of much of inner surface of lobes and tube with upper ends projecting as papillae, cells mostly narrow with sinuous walls. Anther collar usually slender, with elongate cells showing distinct transverse thickenings throughout, with few or indistinct short cells below; exothelial cells mostly quadrate or wider than long; anther appendage large, often truncate at apex. Style without distinct basal node, glabrous, cells of stylar

appendage linear, densely long-projecting. Achene prismatic, usually with setae or serrations on ribs, without glands; carpopodium distinct with prominent upper rim, rounded with thick walled usually quadrate cells; pappus of 5-40 slender sometimes rather fragile setae, with pointed apical cells.

Fleischmannia microstemon (Cassini) R.M.King & H.Robinson, Phytologia 19: 204. 1970.

Fleischmannia sinclairii (Benth. ex Oerst.) R.M. King & H.Robinson, Phytologia 19: 206. 1970.

Hebeclinium A.P.Decandolle, Prodr. 5: 136. 1836.

Plants erect, sparsely branched, large herbs or subshrubs. Leaves always opposite, long petiolate, blades broadly ovate to deltoid, often serrate. Inflorescence a corymbose panicle. Involucre of 25-40 phyllaries in 3-5 series; receptacle hemispherical, glabrous to densely hairy; 20-80 flowers per head; corolla narrowly tubular, 5-lobed, outer surface of corolla glabrous below, lobes usually longer than wide, usually with prominent multicellular uniseriate hairs and a few glands; inner surface of some species with numerous multiseptate hairs; cells of corolla narrow with sinuous walls; anther collar often slender, composed of rather thin walled cells, many quadrate cells in lower part, walls with distinct thickenings. Anther appendages rather large with large cells; style base without enlarged node, glabrous. Styler appendage very narrow throughout, only slightly mamilllose. Achenes prismatic, 4-5 ribbed, setae sometimes present, carpopodia scarcely distinct, only a few rows of short cells at edge, area of longer upper cells merging with sides of achene and extending up ribs, pappus of ca. 30-40 scabrous setae, apical cells pointed.

Hebeclinium macrophyllum (L.) A.P.Decandolle, Prodr. 5: 136. 1836.

Heterocondylus R.M.King & H.Robinson, Phytologia 24: 389. 1972.

Erect or climbing herbs, subshrubs or shrubs; sparingly branched. Lower leaves opposite, upper leaves often to usually alternate, short-petioled, blades ovate to narrowly oblong, entire to serrate.

Inflorescence few to many branched, paniculate to cymose. Heads large, phyllaries 15-30, imbricated to subimbricated, strongly unequal to subequal, in 3-5 series, oblong to lanceolate; receptacle flat, glabrous. Flowers 20-80 per head. Corollas narrowly funnel-shaped, 5-lobed, lobes triangular usually distinctly longer than wide, smooth, glabrous or with a few glands; cells of corolla with mostly sinuous walls; anther collars often thickened above, lower cells subquadrate to wider below, oblong to longer above, walls with annulate thickenings, appendage longer than wide. Styler node present, glabrous or hairy. Style branch broadly linear, smooth to short papillose. Achenes 5 ribbed, ribs setose to glandular, lower part of achene long-tapered. Carpopodium distinct somewhat asymmetrical, frequently stopper-shaped, cells subquadrate, in many series with distinct thickened walls. Pappus in one series, setose, setae 20-35, scabrous, apex unequal to gradually dilated. Apical cells acute.

Heterocondylus vitalbis (A.P.Decandolle) R.M.King & H.Robinson, Phytologia 24: 391-392. 1972.

Mikania Willdenow in Linnaeus, Sp. Pl. (ed 4) 3(3): 1742. 1803.

Plants perennial scandent vines or reclining weak shrubs, sparsely branched. Leaves opposite or very rarely verticillate, petioled. Inflorescence paniculate, racemose, corymbose or rarely cymose, heads sessile or pedicellate. Involucre of 4, mostly narrowly oblong equal phyllaries, with or without a fifth bracteole, receptacle slightly convex, glabrous, 4 flowers per head; corollas campanulate or broadly funnelform, glabrous, 5-lobed, lobes usually longer than wide, cells often large and quadrate with straight walls, stomates absent. Anthers exerted at maturity. Anther collar slender, composed of rather thin-walled, inornate, quadrate cells. Anther appendage large, usually broad, composed of short cells, walls inornate or with beaded thickenings. Style base often stout, rarely with distinct node, glabrous or papillose in species with long papillae on the style branches. Styler appendage linear, usually short papillose. Achenes prismatic, 4-5 ribbed, glabrous or rarely with a few short stalked glands or setae, carpopodia short cylindrical. Pappus of ca. 35-40 scabrous setae, apical cells usually blunt.

Mikania leiostachya Benth., Pl. Hartw. 201. 1845.

1818. Mikania micrantha H.B.K., Nov. Gen. et Sp. 4: 105.
ed. fol.

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